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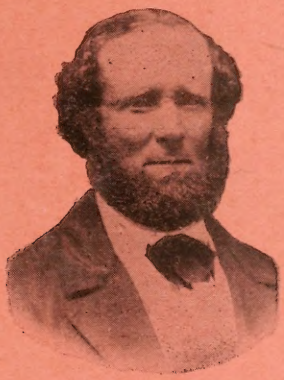
Biological & Medical Serials

Vol. XXIX. No. 6.



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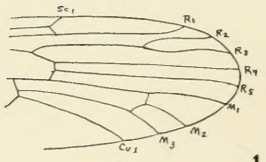

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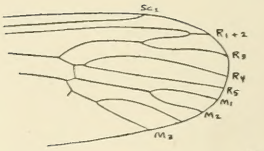

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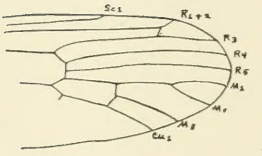

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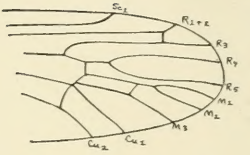

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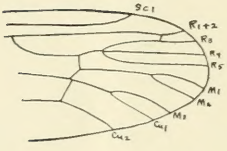

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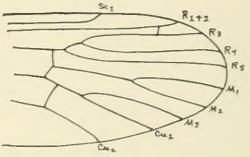

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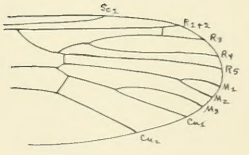

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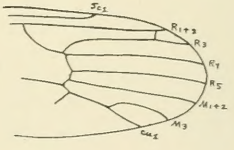

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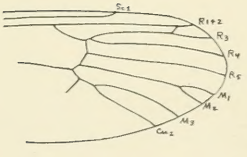

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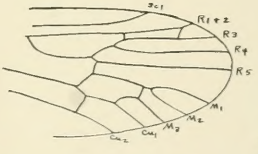

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WING VENATION OF PEDICIINE CRANE-FLIES (TIPULIDAE DIPTERA).—ALEXANDER.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

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A new Interpretation of the Wing-venation of the Pediciine Crane-flies (Tipulidae, Diptera).

By CHAS. P. ALEXANDER, University of Kansas, Lawrence, Kans.

(Plate XII.)

Since the appearance of Needham's exhaustive work on the wing-venation of crane-flies* there has been a tremendous increase in our knowledge of the group, the number of new species described in the past decade being far more than half of all those discovered in the preceding century and a half. These novelties have included many interesting new types that give us additional and suggestive data on some of the critical points of venation. In other papers I have shown the probable true interpretation of the Cylindrotominae and in

* Needham, James George. Venation of the wings of Tipulidae. 23rd Report of the State Entomologist of New York for 1907, pp. 217-248, pl. 11-30; 1908.

this article I wish to take up a similar problem in the Pediciini.

The tribe Pediciini is one of the smaller groups of Tipulidae, in North America being made up as follows: *Pedicia* (4); *Tricyphona* (22); *Ornithodes* (1), constituting the Pediciae; *Rhaphidolabis* (9); *Dicranota* (5) and *Polyangaeus* (1), constituting the Dicranotae. The figures in parentheses are the numbers of apparently valid species at the present writing. The species described by Williston as *Rhaphidolabis debilis* is not included; the type is a mere fragment and the species, to my knowledge, has not been rediscovered, the Alaskan specimens so considered by Coquillett being a *Tricyphona* that was later described as *T. glacialis*.

It seems advisable to discuss at this time the reasons for interpreting the venation of members of this tribe as has been done in recent papers by the writer since the nomenclature of the radial field that was used is very different from that hitherto accepted. Stated briefly, it may be said that the author believes from the data that are now available that the vein that has been called *R*1 is, in reality, *R*1 + 2, the short, oblique branch of *R*2 having been hitherto called the radial cross-vein. It has long been a striking character of this generalized group that the so-called radial cross-vein was situated far out at the tip of *R*1, in some (as *Polyangaeus* Doane, to judge from the author's figure) being beyond the tip of *R*1 and appearing as a free branch of *R*2; in others (as *Tricyphona vitripennis*, *Rhaphidolabis flaveola*, etc.) it is oblique and not unlike the branch *R*2. Recently I have seen a remarkable crane-fly from the north-western United States (*T. protea*) that proves that the above interpretation is the correct one, the free portion of *R*2 being long, oblique and fused with *R*1 only near the wing-margin (see diagram 2).

This interpretation readily disposes of almost all the Pediciine genera, fitting the condition in *Pedicia* and in most *Tricyphona*. It does not fit *Ula* because, as shown elsewhere, this genus is a Limnophiline type‡. The apparent exceptions

‡ Alexander, Chas. P. Biology of the North American Crane-flies, part 3. The Genus *Ula* Haliday, Pomona Journal of Entomology and Zoology, vol. 7, pp. 1-8, plate; 1915.

to the above interpretation occur in the commonest Eastern *Tricyphona* (*inconstans* O. S.), where veins *R*2 + 3 are fused basally with *R*4 for a short distance (see Pl. XII, diagram 6) and the *r-m* cross-vein connects directly with the sector just before its fork, or just beyond the fork on vein *R*5; some Dicranotae (see diagrams 7 and 10) are quite as in the above. It seems to me that this is due to the fusion of veins *R*2 + 3 with *R*4. Thus in *Rhaphidolabis* we get forms (*modesta*, fig. 8, *rubescens*, *cayuga*, etc.) where the cell *R*3 is sessile; in *R. major* (fig. 9) it is very short-petiolate, an intermediate condition to that found in *R. tenuipes* (fig. 7). Even in the last named species alone there is considerable variation in the length of this fusion in a series of specimens. This length of the petiole of cell *R*3, *i. e.*, vein *R*2 + 3 + 4 (according to the present interpretation) is one of the most variable features of venation in the Dicranotae.

This interpretation of the venation would give the Pediciini a much more generalized venation than the earlier interpretation, and other features of the adult and larval organization certainly confirm this belief. All four branches of the radial sector are present, the first, *R*2, being fused with *R*1 for a varying distance back from the wing-margin. It will be seen that the *Tanyderidae* (diagram 1), the only crane-flies known where the full complement of branches of the sector is present and attain the wing-margin unfused, lack the radial cross-vein and this certainly seems to me to be suggestive. If its anterior branch, *R*2, is swung slightly cephalad to fuse with *R*1, then we have the apparent radial cross-vein formed. We must await more evidence before we can finally and accurately interpret the radial field of the wing in all crane-flies since it is by all means the most plastic field of the wing.

In *Dicranota* (diagram 10) and *Polyangaeus* alone of this tribe the true radial cross-vein is present and here is located far before the tip of *R*1, proximad of the upward deflection of *R*2.

The diagrams herein shown (Plate XII) illustrate the following points:

No. 1 shows a typical Tanyderine (*Protoplasa*), the radial field not unlike the supposed ancestral Pediciine type.

No. 2. *Tricyphona protea* Alex.; note the long, oblique free portion of R2, fused with R1 near the margin only (compare these two branches, R1 and R2, with the corresponding figure 1).

No. 3. *T. diaphana* and allies; including *diaphana* (Doane), *exoloma* (Doane) and *frigida* Alex.; here the posterior branch of the sector, R4, and R5 are separate (compare this field of the wing with the corresponding one in fig. 1).

Brunetti (1912) erected the genus *Amalopina* for a small species from India that agrees somewhat in venation with this group of species. Later, Bergroth (1913) was inclined to admit this name as valid, but included with it the group of species just discussed. I do not believe that these three Nearctic species belong to the same group as Brunetti's species which has cell *1st M2* open by the atrophy of *m* and other venational differences. Brunetti describes this group as having the *r-m* cross-vein connecting with "the 2nd and 3rd longitudinal veins." By this I suppose he means the 3rd and 4th longitudinal veins since I know of no crane-fly where the *r-m* cross-vein is not connected posteriorly with the median vein (4th longitudinal). Or, it may be that Brunetti mistook the basal deflection of *R5* for the *r-m* cross-vein since this simulates a cross-vein and apparently connects the veins he describes. If we recognize Brunetti's group *Amalopina* surely we must have other names for the many other groups, such as *T. kuwanai* (fig. 5), *T. aperta* Coq. etc.

No. 4. The common *Tricyphona* type with the branch R2 short and simulating a cross-vein and with veins R4 and R5 fused for a varying distance to form a petiole for cell R4, this fusion being longest in *T. brevifurcata, hannai* and *katahdin.* The following Nearctic species come in this group:

T. ampla (Doane), *T. auripennis* (O. S.), *T. calcar* (O. S.) and *T. autumnalis* Alex. *T. brevifurcata* Alex.; *T. hannai* Alex. *T. aperta* Coq.; *T. degenerata* Alex. *T. hyperborea* (O. S.). *T. glacialis* Alex.; *T. vitripennis* (Doane). *T. septentrionalis* Bergr.; *T. cervina* Alex. *T. vernalis* (O. S.), *T. katahdin* Alex. and *T. paludicola* Alex.

No. 5. *T. kuwanai* Alex. (Japan) has the *r-m* cross-vein connecting directly with the sector and the branches R2+3, R4 and R5 all arising from a single point.

No. 6. The *inconstans* type. Often the *r-m* cross-vein connects directly with the sector before its fork, as shown; cell R3 is usually short-petiolate, veins R2+3 being fused with R4 for a short distance. Species included:

Tricyphona inconstans (O. S.), *T. constans* (Doane).

No. 7. The type of *Rhaphidolabis tenuipes;* the condition of the radial field not unlike the last. Species included:

R. (*Rhaphidolabina*) *flaveola* O. S. *R. polymeroides* Alex. *R. tenuipes* O. S., *R. neomexicana* Alex.

No. 8. *R. modesta* types; cell R3 sessile. Species included:

R. (*Plectromyia*) *modesta* O. S. *R. sessilis* Alex. *R. rubescens* Alex.; *R. cayuga* Alex.

No. 9. *R. major* Alex.; cell R3 very short-petiolate.

No. 10. *Dicranota pallida* type; radial field of the type of No. 7 but the true radial cross-vein present. Species included:

D. pallida Alex. *D. argentea* Doane; D. *noveboracensis* Alex. *D. rivularis* O. S.; *D. cucera* O. S. *Polyangaeus maculatus* Doane.

If the above interpretation of a backward fusion of *R*1 with *R*2 is the correct one, as certainly appears from the data now available, it is the first case of such a fusion in the Tipulidae, the apparent fusion in the Cylindrotominae being no fusion at all but an atrophy of the tips of veins *R*1 and of *R*2, so that the remaining vein, *R*3, simulates a long fusion of *R*1 + 2 + 3 back from the wing-margin.

The early Stages of Corythucha pergandei Heid. (Hem., Hom.).

By Harry B. Weiss and Edgar L. Dickerson,* New Brunswick, New Jersey.

This species is rather widely distributed in New Jersey, having been found by the writers on alder (*Alnus glutinosa*) at Trenton, Morris Plains, Lakehurst, Jamesburg and Plainfield and in nurseries on birch (*Betula nigra, B. lutea, B. populifolia*) at Springfield, Elizabeth and Princeton. White birch (*B. alba*) was examined at numerous localities with negative results. In Smith's List of the Insects of New Jersey it is further recorded from Roselle Park by Barber and from

* The arrangement of the authors' names has no significance and indicates neither seniority nor precedence.

Lakehurst by Torre Bueno. This list also includes a Staten Island record by Davis. Miss Patch, in Bull. 134 of the Maine Agric. Exp. Sta., records it as occurring on willow and alder between Bangor and Orono, Maine, and it also occurs in Ohio, according to Osborn and Drake, in Bull. 8 of the Ohio Biol. Survey. Heidemann, in the Proc. Ent. Soc. Wash., vol. viii, Nos. 1-2, cites records from Pennsylvania, District of Columbia, Virginia, Massachusetts, Illinois and Kansas and states that the National Museum contains specimens labeled as found on elm, crab apple and hazel. Van Duzee in his check list of the Hemiptera of America North of Mexico gives the general distribution as Eastern States and Canada.

It was described by Heidemann in Vol. viii, Nos. 1-2, of the Proc. Ent. Soc. Wash., in which brief mention is also made of the larval forms and eggs. The adult overwinters, having been found by Barber while sitting under alder during November. Heidemann states "under fallen leaves and in crevices of the bark." In New Jersey the insects appear during the latter part of May or first of June, according to the weather, and eggs are deposited on the under sides of the leaves in the pubescent tissue found in the axils formed by the main rib and its side branches. From one to five eggs were found in each axil, each egg usually being inserted at right angles to the leaf surface and all being completely hidden. Eggs were found similarly placed in the leaves of birch. Heidemann records finding the eggs on black alder (probably *Alnus vulgaris*). Considerable feeding takes place during egg deposition. The nymphs after hatching feed in colonies on the under sides of the leaves causing a discoloration of the upper surfaces, which, however, is not as pronounced on alder as the discoloration following the feeding of other species on other plants. On birch, however, the effects of the feeding were much more evident.

By the middle of July adults of the first brood are present and copulation takes place followed by egg-laying during the last of this month. From five to six weeks are required for a complete life cycle and during the last of August or first of

September, adults of a second brood appear and later go into hibernation. On account of the extended oviposition period, it is possible at times to find all nymphal stages feeding together. Colonies of early stage nymphs move around very little. Colonies of fourth and fifth stage nymphs move around more than the younger ones, probably because the leaf tissue at one spot is more quickly exhausted by the larger nymphs.

Egg. Length 0.5 mm., greatest width 0.11 mm. Shape elliptical, broadest one-fourth from basal end. Base rounded forming an obtuse angle. Viewed from side one surface is slightly concave, the other side gradually rounded. Tip about one-half width of egg at basal fourth, with a conical cap, just below which is a constriction. Subtranslucent except for apical half, which is brown.

1st Stage Nymph. Length 0.51 mm., greatest width exclusive of spines 0.16 mm. General shape elliptical, sides marginate. General color of dorsal surface brown. Fine median dorsal line on head and prothorax broadening out into a spot covering most of the dorsal surface of the meso- and metathorax and first two abdominal segments. Posterior abdominal segments lighter at lateral margins. Pro- and mesothorax and each abdominal segment beginning with the second bears a spine on lateral margin. A pair of spines on vertex of head, a pair on front and a double pair on either side of a median line on top of head. A median pair on dorsum of mesothorax and on second abdominal segment. Four median spines in a transverse row arising from tubercles on fifth, sixth and eighth abdominal segments. Each spine tipped with a secreting hair. Eyes red, not prominent. Antennae white, one-third length of body bearing several comparatively long hairs. Rostrum white, one-half length of body, extending beyond third pair of legs. Legs white, tinged with brown at apical ends of femora.

2nd Stage Nymph. Length 0.70 mm., greatest width exclusive of spines 0.3 mm. Shape broadly elliptical, head brown. Light median dorsal streak beginning on head and extending into prothorax. Outer thirds of thorax brown, median third white beginning with posterior half of prothorax. This light median band extends through the first and second abdominal segments, which are also lighter at sides. Remainder of abdomen light brown, somewhat lighter at median posterior portion. Spines on head similar to those of preceding stage, save that the pair anterior to posterior margin of head rest on tubercles which also bear a few hairs. Spines on lateral margins of segments similar to those of preceding stage but more pronounced. A pair of tubercles on dorsal surface of mesothorax and fifth, sixth and eighth abdominal segments each bearing a spine and a few hairs. A pair of

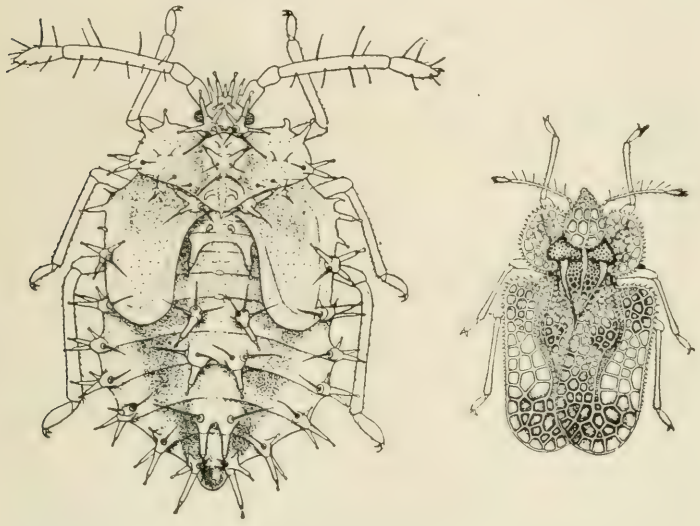
spines on dorsal surface of second abdominal segment. Eyes not prominent, consisting of four distinct, red ommatidia. Antennae, one-fourth of length of body. Legs and rostrum similar to those of preceding stage.

3rd Stage Nymph. Length 0.88 mm., greatest width exclusive of spines 0.43 mm. Shape oval, somewhat pointed at both ends. Slightly narrow at anterior end. General color brown. Fine median line on dorsal surface of head and prothorax widening on meso- and metathorax and extending across the first three abdominal segments. Light median dorsal spot on 7th and 8th abdominal segments. Spines on lateral margins of segments similar to those of preceding stages save those on pro- and mesothorax which rest on tubercles bearing two or three smaller spines. Spines on remainder of dorsum similar to those of preceding stage, but more pronounced. Antennae slightly longer than those of preceding stage. Eyes, legs, rostrum similar to those of preceding stage.

4th Stage Nymph. Length 1.2 mm., greatest width exclusive of tubercles 0.67 mm. Shape oval, sides distinctly marginate. Brownish markings on dorsal surface variable. Lateral and posterior margins of head brown, dorsal surface light at centre. Prothorax brown on either side of centre, lobes light. Median portion of mesothorax light, lobes dark. Metathorax, first, second and third abdominal segments all light in some specimens and a brown band on either side of centre in others. Remaining abdominal segments brown, save for lateral margins and median posterior portion of abdomen which are light. Head bears a pair of separated spines on front, a pair together on vertex, a pair of separated tubercles bearing several spines and hairs on top anterior to posterior margin. Prothorax lobed at sides bearing a pair of spines on outer angle of lobe and two anterior to these. Mesothoracic lobes bearing a pair of spines at outer angle and a single one anterior to it. Spines on lateral margins of abdomen beginning with the second segment. Beginning with the fourth abdominal segment each lateral spine has an additional smaller spine ventral to it. Tubercles and spines on abdomen somewhat similar to those of preceding stage. Dorsal surface of lateral margin of each segment bears a brown hair. Eyes reddish. Antennae white, one-third length of body. Legs similar to those of preceding stage, except that outer extremities of tibiae and tarsi are tinged with brown. Rostrum extending to bases of third pair of legs.

5th Stage Nymph. Length 1.6 mm., greatest width exclusive of tubercles 0.92 mm. Shape broadly oval. Posterior extremity of abdomen forms an obtuse angle. Head light, tinged with brown. Prothorax with a brown band either side of centre, lobes light. Mesothorax light at centre, anterior portion and apex of lobes brown.

Metathorax, 1st, 2nd and 3rd abdominal segments light. Remaining abdominal segments brown, save for margins and dorsal spines which are white. A pair of separated spines on front of head, a pair with united base on vertex. Tubercles on dorsal surface of head near lateral margins prominent, separated, each bearing three spines and



Corythucha pergandei, Heid., 5th stage nymph and adult (after Heidemann).

two hairs. Prothoracic lobes with tubercles at outer angles, each bearing four spines and a hair. Anterior to these tubercles are two large spines with a smaller spine between them and one on either side. Wing-pads of mesothorax with tubercle on lateral margin, this tubercle bearing four spines and a hair; anterior to it are two smaller and two larger spines. Lateral margin of each abdominal segment beginning with the second bears a tubercle with three spines and a hair. A pair of small median spines on prothorax, a pair of smaller ones on mesothorax posterior to these. A pair of median tubercles on posterior margin of prothorax, each tubercle bearing two spines and two hairs. A pair of separated median spines on 2nd, 5th and 8th abdominal segments. Two or three hairs anterior to these spines on 5th, 6th and 8th abdominal segments. Eyes reddish. Antennae, one-third length of body, light, tinged with brown, bearing several long hairs. Legs, light; tip of tibia and tarsus tinged with brown. Rostrum reaching bases of third pair of legs.

Old and New Species of Lopidea from the United States (Hemip., Miridae).*

By Harry H. Knight, Ithaca, New York.

(Plate XIII.)

Lopidea media (Say). Heterop. Hemip. N. Amer., p. 22, 1831. (Plate XIII, fig. 1.).

The various workers on Hemiptera have generally agreed on the species that represents Say's *media,* type of the genus *Lopidea,* there being only one form east of the Mississippi that will fit the original description. Farther west, however, beginning with Colorado, and Texas to the southwest, *media* overlaps with two species, *lepidii* and *intermedia,* forms which could never be distinguished with certainty except by the genital characters. The writer has figured the male genital claspers (Pl. XIII, fig. 1) of a specimen from Missouri which is the same as the generally accepted *media* Say. Males of this species have been examined coming from several States, ranging from Maine to Colorado with two specimens from farther west.

The writer found *media* breeding on *Solidago rugosa* at Four Mile, New York, in company with *Ilnacora malina* Uhler, but judging from the distribution of the species, he is of the opinion that it breeds on other plants also.

Records: ♂ ♀, Aug. 16, Ashland Junction, Maine, ♂ ♀, July 3, Hanover, New Hampshire (C. W. Johnson). ♂ ♀, July 13, Swampscott, Massachusetts (H. M. Parshley). ♂ ♀, July 4, Four Mile, ♂ ♀, July 12, Batavia (H. H. Knight); ♂ ♀, July 3, White Plains (Torre Bueno); ♂ ♀, July, Staten Island (Wm. T. Davis), New York). ♂, July 2, Jamesburg, New Jersey, (W. T. Davis). ♂, June 17, Brightwood, District of Columbia; ♀, Aug. 7, 1907, Hyattsville, Maryland (O. Heidemann). ♂ ♀, May 30 to June 23, Plummer's Island, ♂ ♀, June 4-15, Beltsville, Maryland; ♂ ♀, June 6, Mount Vernon, ♂ ♀, June 23, Glen Carlyn, Virginia (W. L. McAtee). ♂, Ames, Iowa. ♂ ♀, July 15, Springfield, Missouri (H. H. Knight). ♂, Aug. 15, Bozeman, Montana. ♂ ♀, June 26, July 17, Fort Collins, Colorado. ♂, July 3, 1891, Ogden, Utah.

Lopidea intermedia new species. (Pl. XIII, fig. 11).

Similar in coloration to *media* and *lepidii,* to which species

* Contribution from the Department of Entomology of Cornell University.

it is very closely related; differs in being shorter and more compact and in the structure of the male genital claspers.

♂. Length 4.9 mm., width 1.7 mm. Bright red with fuscous and blackish as exhibited in *media*, shorter and more compact, the antennae shorter also; second antennal segment linear, in length (1.31 mm.) less than the width of the pronotum (1.48 mm.) at the base.

♀. Similar to the male in size and coloration.

This species was found breeding on a purple flowering weed that grew in clumps along the small stream that flows by Helotes. Few adults were out at the time of collecting, but the nymphs were found rather plentiful.

Holotype: ♂, July 1, 1917, Helotes, Bexar Co., Texas (H. H. Knight); Cornell University Collection.

Allotype: Taken with the type.

Paratypes: 4 ♂, 5 ♀, taken with the types.

Lopidea robiniae (Uhler). Proc. Ent. Soc. Phila., I:24, 1861. (Pl. XIII, fig. 2).

This is a common and well-known species in the Eastern States, breeding on locust (*Robinia pseudo-acacia*) from which its name is taken. The writer has examined specimens from Georgia, North Carolina, District of Columbia, Pennsylvania, New York, Connecticut and Massachusetts.

This species has in the past frequently been confused with *confluens* and even Uhler was willing to place his *robiniae* as a variety of *media* Say (Proc. Boston Soc. Nat. Hist., 19:406, 1878). The species is easily distinguished by the male genital claspers (Pl. XIII, fig. 2) which are very characteristic; the number of teeth on the basal part of the right clasper and fine spines at the tip of the curved part may vary slightly in number but the general form of the clasper is distinctive.

Lopidea confluens (Say). Heterop. Hemip. N. Amer., p. 23, 1831. (Pl. XIII, fig. 3).

This species is slightly more ovate and robust than *robiniae*, is frequently very similar in coloration but usually more orange or reddish. It has frequently been labeled *robiniae* in collections and the only certain way of determining the yellow forms is by examining the male genital claspers.

The writer found *confluens* breeding on *Polymnia uvedalia* in Missouri and the species doubtless lives also on *P. canadensis*. There appears to be little doubt but that the species here figured is the form described by Say, since this is the only common form in the Middle States, and the only one from Missouri that will fit the original description.

Records: 2♂, July 29-30, ♂, Aug. 13, Batavia, New York (H. H. Knight). ♂ ♀. Aug. 28, Honesdale, Penn. (C. E. Olsen). ♂ ♀, July 19 to Sept. 5, Plummer's Island, Maryland (W. L. McAtee). ♂ ♀, Aug. 11, Springfield, Ohio (W. S. Adkins). 2♂, 5♀, June 10, Flatwood, Alabama; 42♂ ♀, July 15-18, Springfield, Missouri (H. H. Knight).

Lopidea sayi new species. (Pl. XIII, fig. 5).

♂. Length 6.1 mm., width 2.1 mm. Slightly smaller than *staphyleae* but very similar in coloration, the antennae being more nearly linear; bright yellow to light orange, the scutellum and more or less on each side of the commissure, fuscous; base of the head and each side of the median line of the front, tylus, rostrum, antennae, membrane, femora and tibiae, black. Sternum and sometimes part of the venter, fuscous; genital claspers distinctive of the species.

♀. Very similar to the male but with more fuscous and less orange in the yellow.

Holotype: ♂, June 6, 1917, Brown's Ferry on Savannah River, South Carolina (H. H. Knight); Cornell University Collection.

Allotype: Taken with the type.

Paratypes: ♂, taken with the types. ♂, June 15, 1902, Plummer's Island, Maryland (O. Heidemann).

Lopidea caesar (Reuter). Caps. Amer. Bor., p. 67, 1876. (Pl. XIII, fig. 4).

This species was described by Reuter (1876) under the new generic name, *Lomatopleura*, with the type locality given as Pennsylvania. It was later found that Uhler's *Lopidea* (1872) was very similar to *Lomatopleura* and the only points of difference between the type species that could be fixed upon in classification was in the linear and incrassate form of the antennae. The writer has shown in a previous paper that the thickness of the antennae varies in the different species, and

that the incrassate form cannot be taken as a basis for generic distinction. Reuter (1909, Bemerk. u. neark. Caps., p. 72) refers to *caesar*, having before him a male specimen from Texas sent by Mr. Heidemann, and a female specimen which may or may not have been *caesar* (1876). In the same note the author remarks that the second antennal segment of the male is "thinner" than in the female, again showing that he had two species under consideration. The male considered above, being the same as *major* n. sp. from Texas, does have more slender antennae than either *caesar* or *reuteri*. The writer finds that the sexes of a given species of *Lopidea* do not differ in the antennal characters.

The writer has seen the more important collections of Miridae from the United States and, after a careful survey of the *Lopidea* material, he feels quite safe in saying that if the type of *Lomatopleura caesar* came from Pennsylvania, as stated in the original description, then it can be only one of two species, that which the writer figures as *caesar* (Pl. XIII, fig. 4) or the species *reuteri*. These two species are indeed very similar in general appearance, having prominent incrassate antennae, and are the only forms coming from Pennsylvania that could be taken for *caesar*. Reuter (1909) determined at least two species as *caesar* and it is not to be wondered at when one sees how closely together certain species run, the only apparent difference being found in the male genitalia. After a careful study of considerable material with reference to the color characters and distribution of the species, the writer has figured what he believes must be *caesar* Reuter (1876).

Lopidea minor new species. (Pl. XIII, fig. 6).

Smaller and more reddish than *nigridea* but larger than *minima*.

♂. Length 4.5 mm., width 1.6 mm. Fuscous, the exterior half of the corium, the cuneus, sides of the body and head, reddish, the embolium paler; prominent dark brownish pubescence; genital claspers distinctive of the species, showing a close relationship to *davisi* which species is much larger.

Holotype: ♂, "Colorado"; Cornell University Collection.

Paratypes: ♂, topotypic; ♂, Dickinson, North Dakota (H. Osborn).

This species stood in the Cornell Collection as *Lopidea nigridea,* being received in an exchange lot from C. F. Baker in 1896. It differs from *nigridea* in its small size, coloration, and genital claspers.

Lopidea picta new species. (Pl. XIII, fig. 7).

Dark fuscous with black and white, differing from most species of *Lopidea* in the absence of any reddish coloration.

♂. Length 5.5 mm., width 1.78 mm. Dark fuscous, calli, base of the head, tylus and each side of the median line of the front, rostrum and antennae, black; anterior part of the pronotum and the head ivory white, excluding the parts given as black; scutellum except the margins, embolium and cuneus, pale. Side of the pronotum, pleurae and venter, white; sternum, sutures of the pleurae and marks on the sides of the venter and genital segment, fuscous. Legs fuscous to black, coxae except base, lower edge of the femora and apices, pale. Second antennal segment nearly linear. Genital claspers distinctive of the species.

♀. Very similar to the male in coloration, certain forms shorter and more robust with membrane abbreviated.

Holotype: ♂, June 15, 1900, Pueblo, Colorado (E. D. Ball); Cornell University Collection.

Allotype: topotypic.

Paratypes: 4 ♂, 2 ♀, topotypic; ♂, 3 ♀, July 24, 1900, Salida, Colorado.

Lopidea incurva new species. (Pl. XIII, fig. 8).

Slightly larger than *minor* and smaller than *davisi,* reddish with the fuscous on the dorsum much as in *minor;* male genital claspers distinctive of the species.

♂. Length 5 mm., width 1.6 mm. Second antennal segment slightly thicker at the middle and tapering toward base and apex. Dorsum fuscous with only the exterior margins of the corium, pronotum and cuneus, reddish; membrane, antennae, eyes, rostrum and most of the face, fuscous. Legs pale fuscous, coxae and basal half of the femora pale to yellowish and pink, tarsi fuscous to black.

Holotype: ♂, July 17, Langdon, Missouri; Cornell University Collection.

Allotype: July 17, 1892, Galesburg, Illinois (Heidemann collection.)

Paratype: ♂, same data as the allotype.

Lopidea major new species. (Pl. XIII, fig. 9).

Very large, slightly more robust than either *caesar* or *reuteri,* carmine red and only narrowly fuscous along the commissure; male genital claspers distinctive of the species.

♂. Length 7.3 mm., width 2.57 mm. Second antennal segment scarcely incrassated, tapering slightly from near the base toward the apex. Carmine red, the scutellum lightly infuscated and very narrowly along the commissure of the hemelytra; calli, antennae, rostrum, head excepting the juga and bordering the eyes, legs, sternum, genital segment, and membrane, dark fuscous to black.

♀. Length 7.5 mm., width 2.74 mm.; slightly more robust but very similar to the male in coloration.

Holotype: ♂, May 5, 1896, San Antonio, Texas (Marlatt); Cornell University Collection.

Allotype: topotypic.

Paratypes: ♂ 6♀, topotypic.

This is the same species and some of the same material that Reuter (1909) had before him and took to be *caesar* when he stated: "the structure of the male genitalia is very characteristic, the tip of the left (sinistra) forcep being divided into three rather short prongs of equal length, and in addition is armed with a strong tooth nearer the base." It is to be noted that he should have said right clasper instead of left (sinistra); also the female that had "thicker" antennae was a different species, and possibly *caesar.* The material was sent to Reuter for determination by Mr. Heidemann when that worker was preparing his paper "Bemerkungen uber nearktische Capsiden nebst Beschreibung neuer Arten."

Lopidea texana new species. (Pl. XIII, fig. 10).

Very similar to *major* in size and general structure, but in color more orange red than carmine; male genital claspers distinctive of the species.

♂. Length 7.3 mm., width 2.45 mm. To be distinguished from *major* with certainty only by the male genital claspers, these structures showing a close relationship between the species.

♀. Length 7.5 mm., width 2.7 mm. Very similar to the male; the more yellowish or orange red coloration serves to distinguish the females from those of *major* in the small series studied.

Holotype: ♂, Austin, Texas (C. T. Brues); Cornell University Collection.

Allotype: topotypic.

Paratypes: 5 ♀, topotypic; ♀, May, 1896, Texas (Marlatt).

Explanation of Plate XIII.

Male genital claspers of *Lopidea*.

A. left clasper, dorsal aspect. *B*. right clasper, dorsal aspect. *C*. right clasper, posterior aspect. *D*. left clasper, posterior aspect. *E*. right clasper, internal lateral aspect. *F*. right clasper, external lateral aspect.

The Larval Stages of Argyra albicans Lw. (Diptera, Dolichopodidae).

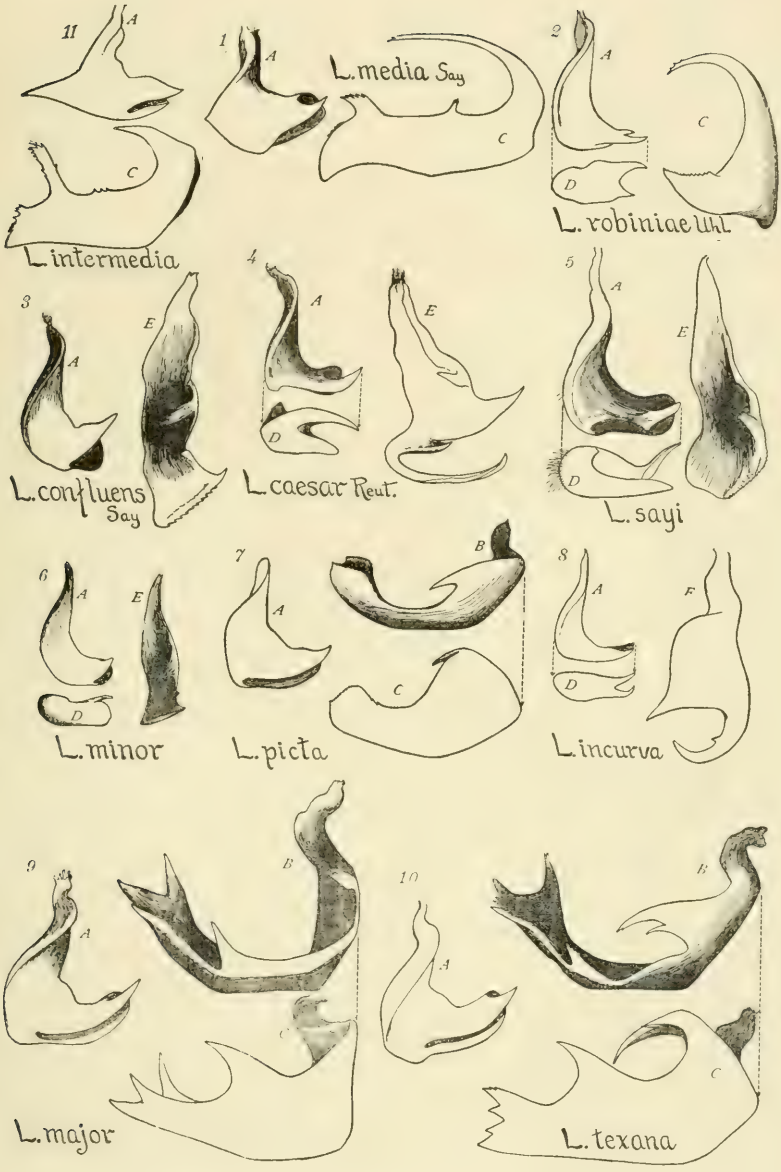
By Werner Marchand, Princeton, New Jersey.

(From the Rockefeller Institute for Medical Research, Department of Animal Pathology).

While collecting Tabanid larvae by sifting the mud of the edge of a pond, some unknown dipterous larvae were found, which, it was thought at first, might be those of *Chrysops*. However, when bred, they gave flies of the family Dolichopodidae. For the determination of the flies I am indebted to Mr. E. T. Cresson, Jr., in Philadelphia, who identified them as *Argyra albicans* Loew. The species has been recorded for Princeton in Smith's "Insects of New Jersey."

In the present condition of entomological literature it is practically impossible for anyone who makes occasional observations on a subject, not directly falling within one's own field of research, to ascertain whether such observations are new or not. I publish the following fragmentary notes on the flies in question, in the hope of a future closer co-operation between students of Dipterous life-histories.*

*According to Malloch's recent paper (1917) a great majority of Dolichopodid larvae are aquatic. Malloch makes no mention of the genus *Argyra*, but points out the meagerness of our knowledge on early stages of this family.



OLD AND NEW LOPIDEAE FROM THE UNITED STATES.—KNIGHT.

Larval stages of a considerable number of, chiefly European, Dolichopodid species, as enumerated by Fr. Brauer (1883), are known; the majority appear to be terrestrial in habit, being found in damp soil, under decaying leaves, in rotten wood, etc. The larva of a species of *Argyra* (*A. vestita* Wiedemann) has been described by Th. Beling in 1882, who found them in the sandy mud of a small brook, the limicolous habit apparently being characteristic for the genus.

The larvae of *Argyra albicans* were much less active than Tabanid larvae; they do not float at the surface as do the larvae of *Tabanus lineola,* which were found in the same localities, and can apparently stay much longer under water than these. They were taken as early as March 24 (4 specimens) and April 1 (one specimen), at the edge of a small pond on the premises of Princeton University, and were kept in a jelly-glass with some wet sand and plant-debris. Two of them, which were seen climbing out of the jar, were transferred on April 7 into a crystallizing-dish with some wet mud, and burrowed into it immediately. On April 17 two oblong cocoons were discovered in the mud, one of which was opened and contained a freshly-formed pupa, bearing two long, horn-like breathing tubes at the anterior end. The pupae were kept in a damp atmosphere, in the crystallizing dish, having a glass cover. On April 20 the eyes had turned yellowish brown, on April 21 dark-brown; on April 22 all parts had become black except the abdomen, which was pale with black hairs visible through the cuticle, and the respiratory tubes, which also were pale. On April 23 at 1.30 p. m. two female imagos of the fly were found. The duration of the pupal period, consequently, was six days. The cocoon of the one specimen which had been left undisturbed was found to have opened by means of a circularly-cut cover, the pupal shell protruding from the opening in its entire length (fig. 1*d*). Of the two flies one was killed, the other one kept alive in a test tube with a piece of apple rind, but had died on the following morning.

Description:

Larva. (Fig. 1 *a*). 6-9 mm. in length, 1 mm. in diameter, 12-segmented, elongate-cylindrical, narrowed anteriorly, the first segment being small, the second and third larger, the following segments of about equal length, 11th and 12th segments slightly enlarged. Head small, two chitinous rods supporting the mandibles extending into the third segment, head and these rods brownish-black. Remaining body semi-transparently yellowish-white. Respiration metapneustic, two slender tracheal trunks extending all along the body, giving off branches to each segment, their openings near together in a groove at the dorsal side of the 12th segment; two shorter tracheae, which extend through segments 11 and 12, likewise opening into this groove. Dorsally, on the 12th segment, on both sides of the respiratory groove, two triangular lobes formed by the integument; two similar lobes placed somewhat behind the latter and lower on the same segment. On the anterior border of segments 3-8 a narrow row of minute

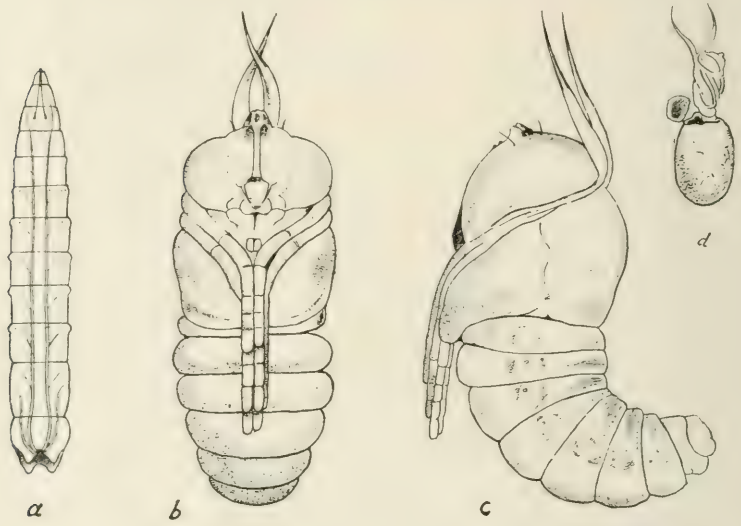


Figure 1. Early stages of *Argyra albicans* Lw. *a*, larva; *b*, pupa, ventral view; *c*, pupa, lateral view; *d*, earthen cocoon with empty pupal shell projecting from it.

spines. Similar rows of minute spines on ventral side. Otherwise the cuticle smooth, glassy, shining, not striated. Edges of segments 5-10 somewhat prominent, reminding of vestigial prolegs.

Pupa. (Fig. 1 *b* and *c*). 3-3.5 mm. in length (with breathing-tubes 4 mm.). Length of the breathing-tubes 1 mm. Dorsoventral diameter of thorax 1.5 mm. Conical; thorax considerably thicker than abdomen, the latter narrowing down towards the tip. Head large, two black tubercles at the front, placed narrowly together, two small ones

in front of these; a bristle on each side of this tubercle; two dark narrow lines extending from here downwards to the face. Above the region of the mouthparts two appressed bristles slightly converging with their tips. On anterior edge of prothorax two slender respiratory tubes of equal length, projecting beyond the head, flattened and pale at base, pointed and shining black at the tip. General color of fresh pupa white, head more yellowish. Abdomen 9-segmented, white, on dorsal side reddish. Dorsally on each abdominal segment near its posterior border, a transverse row of very small, short, brownish spines. Lateral abdominal spiracles present but not very distinct. The spiracular areas with minute punctuation. On the ventral side of 8th abdominal segment a fleshy prominence corresponding to the larval anus. Last segment (of female pupa) short, with low wart-like prominences. Wing-cases rounded, smooth; leg-cases free, considerably longer than wing-cases. Pupation in the mud, in oval-shaped, earthen cocoon, 5 mm. in length, with smooth inner walls.

I notice that Beling, in his description of the larva of *Argyra vestita,* mentions not four but five integumental lobes on the 12th segment, counting three upper ones, the middle one of these, however, often being much smaller than the two lateral ones.

In the pupa of *Argyra vestita* Beling mentions on the front four, short stiff bristles; he did not observe the cocoon formed for pupation.

The habit of opening the pupal cocoon by means of a "cyclorrhaphous" cover, is of some interest and may throw light on the evolution of cyclorrhaphous from orthorrhaphous Diptera. While, as seen in this case, some orthorrhaphous Diptera form cocoons, which they open after the fashion described, it is quite possible that in cases where pupation takes place within the larval skin, the instinct to detach the cover from a surrounding cocoon is transferred to the larval skin surrounding the pupa, and as this closely adheres to the pupal surface, the pupa opens it by the same means. If this is so, then all flies which became cyclorrhaphous originally made cocoons, a habit which would serve to explain the barrel-like shape of the puparia and also, to some extent, the fact that the last larval skin is not shed; in some cases the skin may adhere to the inner side of the cocoon, especially if the latter

is made of hardened earth or clay, and the final molt may become mechanically dependent on this factor and impossible without it. In a later stage, when the insects have adapted themselves to a new environment, no cocoon is formed, but pupation takes place as if there were a cocoon surrounding the pupating larva; the larval skin cannot be successfully shed, and the result is a puparium, but the latter, consisting of both larval and pupal skin, is opened after the fashion of a cocoon.

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Malloch, John R., 1917. A Preliminary Classification of Diptera, Exclusive of Pupipara, Based upon larval and pupal characters, with keys to imagines in certain families. Part I., Bull. Ill., Lab. of Nat. Hist., Vol. XII, Article III, pp. 403-407 (Dolichopodidae). March.

Psyllidae of the vicinity of Washington, D. C., with description of a New Species of Aphalara (Hom.)

By W. L. McAtee, Washington, D. C.

The list of species herein presented comprises the psyllids recorded from the District of Columbia region in the papers cited in the bibliography plus those obtained by the writer and other collectors whose names are mentioned in connection with their captures. The list totals 23 species, and may be compared with those for the vicinity of Ames, Iowa,[1] 15 species, of which 4 were described as new; for New Jersey,[2] 18 species, of which one is cited merely as n. sp. and 3 are recorded on hypothetical grounds; and for Colorado, 18 species, 14 of them cited under manuscript names.[3]

Of the 23 species here listed 5 were originally described from material obtained wholly or in part from the vicinity of

[1]Mally, C. W. Proc. Iowa Ac. Sci. 1894 (1895), pp. 152-171.

[2]Smith, J. B. Rep. N. J. State Mus. 1909 (1910) pp. 108-110.

[3]Gillette, C. P. and Baker, C. F. Bul. 31, Colo. Agr. Exp. Sta., 1895, pp. 113-115.

Washington. For the benefit of those interested in the fauna of Plummers Island, Maryland, it may be said that 10 of the species have been collected on the island and 3 others nearby.

Livia Latreille.

L. maculipennis Fitch.—Obtained by sweeping in marshy situations in May and June and by beating pine foliage January to June, also in October. Abundant.

L. marginata Patch.—The only specimens seen were collected at Falls Church, Virginia, July 24, by Nathan Banks. These were living in tufts of sedge, the upper leaves of which were entirely etiolated.

L. vernalis Fitch.—Swept in marshy places in May and beaten from pine from January to September; has been taken also in October. Abundant.

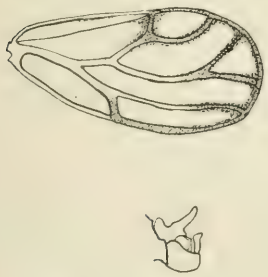
Aphalara Förster.

A. calthae Linnaeus.—A very abundant species; propagates here apparently exclusively upon *Polygonum*, commonly on *P. lapathifolium*. Has been collected on the food plant from June to October and upon pine from January to April.

A. eas new species. (Text figs.)

Named in honor of Mr. E. A. Schwarz, who has done much careful study of Psyllidae, and published some excellent papers on the family.

A species of *Aphalara*, recognizable at a glance by its chunky appearance, and broad milky fore wings with some of the veins darkened distally. This species belongs to the section of *Aphalara* that has the clypeus rounded truncate and projecting but little beyond plane of face, and from comparison with descriptions in Crawford's monograph and with specimens in the U. S. National Museum appears to be undescribed.



Aphalara eas n. sp. Upper figure, forewing. Lower figure, male genitalia.

Length of body, 1.74 to 2.31 mm.; of wing, 2.24 to 2.64 mm. Width of head, .69 to .76 mm.; of thorax, .82 to 1 mm.

General color of the body yellowish-green to yellow-brown, with following brown to blackish markings: last 2-3 joints of antenna, underside basal two joints; impressions of vertex and pronotum; a divided semicircular spot on front of praescutum; 4 vittae on scutum, those of inner pair curved and pointed anteriorly; distal ends of tibial and tarsal joints; most of

the thoracic sutures; ventral segments largely; and tips of genitalia.

Fore wings milky hyaline, veins thick; veins near apical margin and especially those bounding marginal cells, dark and bordered by narrow brownish clouds.

Male forceps almost boot-shaped in profile, the "toe" directed posteriorly. Whole genitalia of about the same shape as in *A. picta* Zett.

Type male and *allotype* (in my collection) from Plummers Island, Maryland, May 1, 1914, W. L. McAtee. *Paratypes* include specimens from Plummers Island, April 23, 1916, L. O. Jackson; Maryland near Plummers Island, April 28, 1915; May 9, 1913; May 18, 1913, W. L. McAtee, and Great Falls, Maryland, May 6, H. S. Barber. Five specimens with the last data are in the National Museum Collection.

My specimens were obtained by sweeping low vegetation, the particular food plant unfortunately not being determined.

A. picta Zetterstedt.—Specimens labelled Washington, D. C., are dated from May 19 to October 15, and simply Virginia, from May 23 to September 7. Other specimens have been taken at Beltsville, Maryland, June 15, 1913, Mount Vernon, Virginia, June 6, 1915, McAtee; and Dyke, Virginia, May 28, 1915, L. O. Jackson. Specimens in the National Museum collection bearing the cabinet name *A. asteris* Riley belong to this species.

A. veaziei Patch.—Abundant; extreme dates of collection May 11 to September 23. A cabinet name *A. solidaginis* Riley indicates a food plant, though probably not the sole one. The species has been beaten from pine in June. In general appearance this species and the last seem almost to grade into each other, but the male genitalia are distinct. The form *A. veaziei metzaria* Crawford apparently has not been taken about Washington, but I have swept it from salt marshes at Wallops Island, Virginia, (May 25, 1913).

Calophya Loew.

C. flavida Schwarz.—Originally described from District of Columbia material. Occurs only upon *Rhus glabra* where it has been collected from May 1 to August 4. Usually rather scarce.

C. nigripennis Riley.— Abundant on *Rhus copallina,* May 4 to June 29. Mr. E. A. Schwarz says: *"Our eastern species hibernate as full grown larvae or pupae on the stems of their food plants and there is but one generation each year."

* Proc. Ent. Soc. Wash. 6, 1904, p. 240.

Trioza Förster.

T. aylmeriae Patch.—Mt. Vernon, Virginia, February 28, L. O. Jackson; and March 21, 1915, McAtee.

T. diospyri Ashmead.— Abundant on persimmon (*Diopyros virginiana*); March 26 to August 14.

T. obtusa Patch.—Washington, D. C., April 6 and 27, 1885; Maryland, February 22, 1884, A. Koebele; Dead Run, Virginia, in flowers of *Amelanchier*, April 23, 1916, L. O. Jackson. Cabinet name, *T. amelanchieris* Riley.

T. salicis Mally.—Common on willow from June to August, though nymphs have been collected as late as October; found on pine foliage from November to April.

T. tripunctata Fitch.—Probably the most abundant species of Psyllid in this region. Plants of the genus *Rubus* are said to be the true hosts, but it would seem hardly enough specimens are seen upon *Rubus* (May-July) to account for the great abundance of the species on pine (October-June).

Neotriozella Crawford.

N. immaculata Crawford.—Washington, D. C., October, 1883, E. A. Schwarz; Mt. Rainier, Maryland, November 14, 1915, L. O. Jackson; Eastern Branch, near Bennings, D. C., on *Pinus virginiana*, December 30, 1915, McAtee.

Hemitrioza Crawford.

H. sonchi Crawford.—Washington, D. C., June 13, 19, 22, 26; Virginia, October 9, 1881, E. A. Schwarz; Four-mile Run, Virginia, June 29, 1913, A. Wetmore. All of this material except last lot, was used in connection with the original description of the species (and genus).

Pachypsylla Riley.

P. celtidis-gemma Riley.—Common on hackberry, May 8 to June 7.

P. celtidis-mamma Riley.—Not very common; found on hackberry May 13 to August 15, and on red cedar (*Juniperus virginiana*) and other conifers from October to February. Specimens labelled *P. c.-minuta* seem to be only small individuals of this species.

P. venusta Osten Sacken.—Department of Agriculture grounds, Washington, D. C., September, 1892. Miss M. Sullivan. Originally described from Washington, D. C.

Psyllopsis Loew.

P. fraxinicola Förster.—Washington, D. C., May 18 to August 10, Hubbard and Schwarz.

Psylla Geoffroy.

P. annulata Fitch.—Beltsville, Maryland, May 28, 1916; August 14, 1914, McAtee.

P. carpinicola Crawford.– Common on *Carpinus caroliniana*, May 15 to October 11.

P. cephalica Crawford.—Washington, D. C., July 1, August 17, E. A. Schwarz.

Bibliography.

Crawford, D. L.—1914. A monograph of the jumping plant-lice or Psyllidae of the New World. Bul. 85, U. S. Nat. Mus., 186 pp., 541 figs. [Records 15 species from the District of Columbia. Among them *Hemitrioza sonchi*, new genus and species and *Psylla cephalica* new species are described from District material in part.]

McAtee, W. L.—1915. Psyllidae wintering on conifers about Washington, D. C. Science, N. S., 41, June 25, p. 940. [Five species discussed.]

Osten Sacken, C. R.—1861. Ueber die Gallen und andere durch Insecten hervorgebrachte Pflanzendeformationen in Nord-America. Ent. Zeit. Stettin. 22, Nos. 10-12, Oct.-Dec. pp. 450-423. [Describes *Celtis* gall and gall maker, *Psylla* (now *Pachypsylla*) *venusta* from Washington, D. C.]

Schwarz, E. A.—1904. Notes on North American Psyllidae, Part I. Proc. Ent. Soc. Wash., 6, No. 4, Nov., pp. 234-245, figs. 6-12. [Describes *Calophya flavida* new species and records *C. nigripennis* Riley, from the vicinity of Washington, D. C.]

Life History and Habits of Gastroidea caesia Rog. (Col.)

By Milton T. Goe, Portland, Oregon.

These beautiful, little, dark-green beetles are to be found in countless numbers in and around Portland, Oregon, from the latter part of March until late in autumn. Plants of the Dock species, *Rumex crispus* and *Rumex obtusifolius*, are their favorite hosts, and on bright, warm days both adult and larva may be found feeding upon the leaves of these plants; but during cold or rainy days they take shelter in the ground near where they are feeding. From my observations, I find of the two *Rumex* species, they prefer *obtusifolius*. The adult beetle and the larva both feed greedily upon the leaves of these plants; the larvae eat the parenchyma off the upper and under surface of the leaves, but are more often found on the under side. The adults are even more devastating than the larvae,

frequently destroying the whole of the leaf except the midrib. The Gastroideas are so fond of these plants, and confine themselves so closely to them, that they might well be given the common name of Dock Beetles.

During my investigation of these Chrysomelids in their natural surroundings and in captivity, rhubarb was the only cultivated plant upon which I found that they would feed, though I tested them with lettuce, radish, beet and other plant leaves. They ate sparingly of the rhubarb leaves and readily left them when given access to dock.

Although they have well developed wings they never fly and their protection from enemies is their color and habit of feigning death.

The female deposits her eggs, which are elongated and of a dark-yellow color, in irregular masses on the under side of the leaves. The number of eggs in these masses varies, but is usually from thirty to forty. The eggs are always deposited during the day, the individual laying later each day until the laying is quite late in the afternoon, then she begins in the early morning once more. One especially productive female deposited a batch of thirty-four eggs in the early morning and thirty late in the afternoon of the same day, but this was an exception and the only instance in which I have known of more than one batch of eggs being deposited during the same day. Occasionally there are days of rest when no eggs are laid. One female deposited thirty-three eggs on the fifth day after reaching maturity, which shows how closely one generation may follow another. The first generation of females, which mature from pupae that have passed the winter in the ground, is the most productive generation of the year. While the average number of eggs produced each day is less than the average number produced by later generations, the adult life period, and therefore the productive period, is longer than that of later generations. During the height of the season of ovipositing, the abdomen of the female is so dilated that the elytra stand at almost right angles to the body, the female at this time being much larger than the male. At the end of the laying season the abdomen returns to its normal size. There are four or

five generations of this beetle each year, the number of generations depending upon the length of the warm season. The life of the male is much shorter than that of the female; from my observations I found the life of the female to be about three times the length of that of the male.

Following are the dates and number of eggs laid by a female beetle of the first generation, the period of incubation, larval period and the time required for pupation:

March	31	29 eggs	April	14	32 eggs	April	28	38 eggs
April	1	36 eggs	April	15	None	April	29	33 eggs
April	2	31 eggs	April	16	31 eggs	April	30	None
April	3	30 eggs	April	17	32 eggs	May	1	34 eggs
April	4	32 eggs	April	18	None	May	2	33 eggs
April	5	37 eggs	April	19	38 eggs	May	3	36 eggs
April	6	None	April	20	32 eggs	May	4	30 eggs
April	7	21 eggs	April	21	37 eggs	May	5	36 eggs
April	8	37 eggs	April	22	32 eggs	May	6	None
April	9	32 eggs	April	23	32 eggs	May	7	None
April	10	32 eggs	April	24	33 eggs	May	8	33 eggs
April	11	9 eggs	April	25	35 eggs	May	9	None
April	12	24 eggs	April	26	34 eggs	May	10	None
April	13	36 eggs	April	27	None	May	11	None
						May	12	22 eggs

Total, 1049 eggs.

This female laid no more eggs after May 12th and on May 18th we found her dead on a leaf of dock; most of these beetles go into the soil to die.

April 9th, fifteen larvae hatched from the batch of twenty-nine eggs laid on March 31st. These tiny, black, worm-like larvae were kept in a jar containing about two inches of soil, and provided with fresh dock leaves daily. The larvae of these beetles do not seem to moult, but simply grow larger until they enter the soil for pupation.

April 26th all of the larvae living at that time, ten in all, entered the soil to pupate. Nothing more was seen of them until May 10th, when five fully developed beetles emerged from the soil, five having died during the pupal period.

During the process of transformation these insects change in color from black to yellow, and from yellow to green.

From notes taken at different times I find that the time for incubation is from six to ten days; the larval period is from ten to sixteen days, and the pupal period is from fourteen to sixteen days.

Records of North Carolina Odonata from 1908 to 1917.

By C. S. Brimley, Raleigh, North Carolina.

These records include those of species not hitherto taken in North Carolina, as well as any other records which materially extend the range of other species. The species new to North Carolina are marked with a star (*).

Calopteryx dimidiata Burm. Wakefield, Wake County, eleven taken on Buffalo Creek, five miles from here, July 4, 1908, C. S. B.

Lestes vigilax Hagen. Pine Bluff, Moore County, twenty-one taken in July, 1914, by J. D. Ives.

***Amphiagrion saucium** Burm. Raleigh, May 18, 1909, one female. Sunburst, Haywood County, three in May, 1912, one in May, 1913, C. S. B.

Argia fumipennis Burm. Raleigh, one, July 14, 1914. Pine Bluff, July, 1914, seventeen, J. D. I.

Argia putrida Hagen. Pine Bluff, six in July, 1914, J. D. I.

Argia tibialis Rambur. Pine Bluff, July, 1914, J. D. I.

Argia violacea Hagen. Wakefield, Durham and Fuquay Springs (in Wake County) are three new localities.

***Enallagma geminatum** Kellicott. Pine Bluff, a pair taken by Prof. Ives in June, 1914.

***Ischnura prognatha** Hagen. Raleigh, twenty-seven taken along pools in marshy stream running into Walnut Creek, August 1 to 29, 1914, C. S. B.

Telagrion daeckii Calvert. Southern Pines, June 23, 1909 (1), C. S. B.; Pine Bluff, July, 1914 (5), J. D. I.

Gomphus brimleyi Muttkowski. Lumberton (as *G. parvulus* in Ent. News, March, 1904; identification changed to *G. abbreviatus* in Ent. News, March, 1906), also from Southern Pines, April 29, 1908; White Lake, Bladen County, May, 1910 (F. S.), and Raleigh, May 15, 1915, C. S. B.

***Gomphus plagiatus** Selys. Lake Waccamaw, September 20, 1915, R. W. Leiby.

***Gomphus vastus** Walsh. Black Mt., late May, 1910, F. Sherman.

***Hagenius brevistylus** Selys. Raleigh, one male, August 22, 1914; also one seen mounted in collection of Mr. A. H. Manee at Southern Pines, and said to have been taken by him there.

***Lanthus parvulus** Selys. Andrews, Cherokee County, tenerals common in mid-May, 1908, C. S. B. Sunburst, rather common in late May, 1913, but none seen at same season in previous year, C. S. B. Black Mt., late May, 1910, two, F. S.

Progomphus obscurus Rambur. Pine Bluff, July, 1914; Southern Pines, June 22, 23, 1909, C. S. B. Fuquay Springs, June 22, 1911, C. S. B.

Tachopteryx thoreyi Hagen. Raleigh, two taken by H. Spencer, May 14, 1916, near Lake Raleigh.

Aeshna umbrosa E. M. Walker. The specimens previously listed by me from Raleigh, Linville and Highlands as *A. constricta* should be referred here. Blowing Rock, September 4, 1915, one male.

Epiaeschna heros Fabr. Southern Pines, May 15, 1909, A. H. Manee.

Cordulegaster diastatops Selys. Andrews, late May, 1908. Sunburst, a few in late May, 1912, and 1913, C. S. B.; three in mid-June, 1911, F. S. Southern Pines, April 8, 1910, A. H. M. Aquone, Franklin County, mid-May, 1911, F. S.

Cordulegaster fasciatus Rambur. Ridgecrest, mid-July, 1916, taken by some boys and brought to Mr. Sherman's office.

Didymops transversa Say. Greensboro, early May, 1913, C. S. B.

Helocordulia selysii Hagen. Raleigh, March 18, 1908, and April 17, 1914, C. S. B.

Macromia georgina Selys. Our Raleigh Macromias seem to belong here, including those formerly listed as *M. taeniolata* and *M. illinoensis* (Ent. News, May, 1903, and March, 1906). Rather uncommon at Raleigh, flying both over streams, and in open places in dry upland woods, from late June to mid-September, also Southern Pines, September 6, 1909.

***Macromia australensis** Williamson. Raleigh, July 26, 1916, one female lacking the antehumeral stripes, may belong here, if not merely a variation from *M. georgina*, which it otherwise resembles (C. S. B.).

Neurocordulia obsoleta Say. Southern Pines, June 5, 1909, A. H. M.

Tetragoneuria cynosura Say. Southern Pines, April 4, 1910, A. H. M.

Tetragoneuria cynosura simulans Muttkowski. Here belong my *"semiaquea"* records from Lumberton and Raleigh.

Tetragoneuria semiaquea Burm. Here belong all my *complanata* records, also the *semiaquea* records from Lake Ellis. Other localities are Southern Pines, late March and April, Manee; White Lake, May, 1910, F. S.

Celithemis elisa Hagen. Southern Pines, August 11, 1909, three, A. H. M. Pine Bluff, June, July, 1914, J. D. I. Raleigh, August 29, 1914, August 8, 1916.

Celithemis fasciata Kirby. Southern Pines, June 23, 1909, C. S. B. Lakeview, June 11, 1912, C. S. B. Pine Bluff, June, July, 1914,

J. D. I. Raleigh, six in July and August, 1914 to 1916, C. S. B.

Celithemis ornata Rambur. Pine Bluff, June, July, 1914, J. D. I. White Lake, early June, 1915, F. S.

Erythrodiplax minuscula Rambur. Raleigh, June 18, 1908, August 3, 1915, C. S. B. Pine Bluff, June, July, 1914, J. D. I.

Ladona deplanata Rambur. Raleigh, April 21, 1916.

Libellula auripennis Burm. Cape Hatteras, July, August, 1909.

Libellula axillena Westwood. Raleigh, August 4, 1908, July 16, 26, 1917; Wakefield, July 1, 1908, C. S. B. Southern Pines, August 11, 1909, A. H. M.

Libellula flavida Rambur. Fuquay Springs, June 20, 1911, two; Pine Bluff, three in June and July, 1914, J. D. I.

Libellula pulchella Drury. Sunburst, late May, 1913, C. S. B.

Libellula semifasciata Burm. Sunburst, late May, 1913, at 4000 feet elevation, C. S. B.

Libellula vibrans Fabr. Southern Pines, June 23, 1909, A. H. M.

Nannothemis bella Uhler. Southern Pines, June 23, 1909, abundant. Pine Bluff, twenty-six in June and July, 1914, J. D. I.

***Pantala hymenaea** Say. Raleigh, August 11, 1915, one female.

These records are based on my own collecting, on collecting done by Mr. F. Sherman, Entomologist to the State Department of Agriculture, and his assistants, on specimens received from Mr. A. H. Manee, of Southern Pines, and on collections made by Professor J. D. Ives, formerly of Wake Forest College, at Pine Bluff, Moore County, in June and July, 1914.

The total number of forms of Odonata which I now have on record from North Carolina is 104, of which 36 are Zygoptera, and the remaining 68 Anisoptera.

A New Species of Johannsenomyia (Ceratopogonidae, Diptera).

By J. R. Malloch, Urbana, Illinois.

In describing the present species I take the opportunity to correct an error in my synopsis of this genus.*

The species *stigmalis* Coquillett should be placed among those with unspined fifth tarsal joint, and should run down to section 7 in the key. The characters cited under the first subsection of 12 should be transferred to 7 as an additional subsection.

* Bull. Ill. State Lab. Nat. Hist., vol. X, art. 6, p. 332 (1915).

To include the present species, Section 12 should be changed to read as follows:

12. Tarsal claws exceedingly long, those of each hind pair very unequal, the inner about 4 times as long as the outer, ...**annulicornis** n. sp.
.....Tarsal claws short, subequal on all legs.....13

Johannsenomyia annulicornis sp. n.

♀. Black, slightly shining. Back of head and vertex brown, remainder of head and its appendages yellow, apices of the short flagellar joints, and all of the long joints except the bases of the first two fuscous. Thorax, except prothorax, and abdomen black. Legs yellow, mid and hind coxae, hind femora except bases, hind tibia on basal half, the extreme apices of basal four joints and all of apical joints on all legs fuscous. Wings clear, region of cross-vein infuscated. Halteres dark brown.

Antennae very slender, longer than head and thorax combined. Thorax densely short-haired; mesopleurae with similar short hairs on the greater portion of its surface. Legs very long, fore and hind femora thickened apically; tibiae not setulose; basal joint of hind tarsi but little shorter than hind tibiae; apical tarsal joint on all legs with a double series of long bristles on basal half; claws each with a short tooth at base, inner claw on hind tarsi about four times as long as outer. Third vein ending about one-eighth from apex of wing, first at about one-fifth of distance from cross-vein to apex of third; media and cubitus forking before cross-vein. Length, 4 mm.

Type. ♀, Illinois State Laboratory of Natural History.

Type locality, Lake Villa, Illinois, July 21, 1916 (C. A. Hart).

A New Species of Macrosiphum (Aphididae, Hom.).

H. F. Wilson, University of Wisconsin, Madison, Wisconsin.

This insect occurs commonly on the leaves of *Rhododendron californicum* Hook. along the coast region of Oregon. The description was made from specimens collected at New Port, Oregon, June 15, 1915. Apterous, alate and pupal forms were present in great numbers.

Types mounted in balsam on slides, in my collection.

Macrosiphum rhododendri, n. sp.

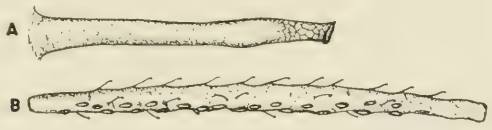
Apterous viviparous female. General color pale green, a few pinkish forms were also taken. The distal end of the fifth and the entire

sixth segment with unguis dusky. Distal ends of tibiae and tarsi also dusky. Hairs on antennae, legs and body short and heavy, spinelike, capitate at the tip. Antennae slightly longer than the body. Unguis slightly longer than the third antennal segment. Third segment with two or three small circular sensoria. Antennal tubercle prominent and gibbous. Nectaries more or less cylindrical, but with a slight taper and slightly curved toward the center. This latter character produces a slightly swollen effect which is accentuated by the constricted tip.

Measurements. Body length, 2 mm. Length of antennae: total length 2.26 mm. Antennal segments III. 0.58 mm.; IV. 0.38 mm.; V. 0.38 mm.; VI. 0.13 mm.; Unguis 0.56 mm. Length of nectaries inside 0.55 mm. Cauda 0.22 mm.

Pupae. Dark grey to chocolate brown.

Alate viviparous female. General color pale green, head and thorax dusky to black. Antennae with outer two-thirds dusky. Tibiae at distal end, and tarsi dusky. Antennae a little longer than the body. Fourth segment a trifle longer than the unguis. Third segment with 30 to 40 irregularly sized circular sensoria. Antennal



Macrosiphum rhododendri n. sp.—A, Nectary. B, Third antennal segment.

tubercles large and gibbous. Nectaries as in the apterous form. Cauda turned upward and constricted toward the middle, as in drawing.

Measurements. Body length, 2.22 mm. Length of antennae, 2.25 mm. Antennal segments. III. 0.578 mm.; IV. 0.4 mm.; V. 0.41 mm.; VI. 0.09 mm.; Unguis, 0.53 mm. Nectaries, 0.445 mm. Cauda, 0.24 mm.

Coenonympha brenda (Lep.: Satyridae).

I spent the last of August, 1917, in the Greenhorns above Glenville, California. Noticing a pallid little Satyrid, I took half a dozen, more for purposes of identification than anything else. Because of limited opportunity to collect and miserable facilities for preserving a collection in the oil-country, I usually foolishly disregard the insignificant sorts. Imagine my chagrin, on reaching home, to find my Satyrid to be *Coenonympha brenda!* While not gregarious, three or four were fluttering languidly over every high, grassy knoll, and a day's collecting would have yielded a hundred specimens. I wonder if *C. brenda* is a late-fall species, coming after we have about given up collecting, and thus has escaped notice?—W. H. Ireland.

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., JUNE, 1918.

Making the Editorial of Greater Use To Entomology.

In a recent (December, 1917) number of the *Sigma Xi Quarterly*, the literary editor of *The Independent* has some amusing remarks "From the other side of the Barricade," the obstacle in question being that which separates editors from non-editors. Many topics are touched upon but for our present purpose we wish merely to quote the following:

> And there are others, graduate students, assistants, teachers, men who stand at the very frontier of human knowledge, familiar with sources, knowing real science from fake science, eager and able to write, but when they come to me or I get after them they ask helplessly: "What do you want me to write about?"
>
> What do they take an editor for anyway? If I knew what they know I should not ask them to write. I should do it myself. Do they think that our correspondent somewhere in France cables to us: "Come over and tell me what there is here to write about"? Do they think that our musical critic drops in to ask: "Have I heard any new composers lately whom you think I ought to write about and, if so, what should I say about them?" Did Columbus go to King Ferdinand and inquire: "Has Your Majesty anything in the sea-faring line that you would like to have me do?"

To these extracts we should like to add the last sentence from the First Report of Committee on Zoology of the National Research Council: "The Committee . . . . invites from every zoological investigator in the country a statement of the things most urgently needed for the promotion of his own research work."

The needs and problems of *The Independent* are not those of the NEWS or of other entomological journals, at the present time at least. Whatever opinions may be held as to the value of the articles published in the periodicals of our science, there is now no lack of material to occupy the available monthly or quarterly space. These articles are almost wholly technical, often narrowly so. But in the prosecution of such special and limited researches, difficulties, errors and hind-

rances of various kinds continually appear. Many of these could be overcome, avoided, or removed by pointing them out and discussing them in a general and impersonal manner. Here the editorial page offers an opportunity and the NEWS will be glad to have suggestions, from those enumerated in the first sentence quoted above from the *Quarterly*, as to just what some of their problems are so that the editors may discuss them. Many of the editorials which have appeared in this journal have been based on such conscious or unconscious criticisms, contained in letters, manuscripts received for publication and other sources. But we should like to have more of them, for the editors of the NEWS do not know all that its readers and contributors know. By such co-operation our editorials can surely be made of greater use and assistance to the progress of entomology.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

An Extra Molt in the Nymphal Stages of the Chinch Bug (Hem., Het.).

In 1875 Riley in his Seventh Missouri Report published an original description of the four nymphal stages of the chinch bug accompanied by figures of the different life history stages. His descriptions and figures have been accepted as authentic and have been copied repeatedly by various writers. Professor Forbes improved the original figures immensely by publishing in the Twenty-third Illinois Report, 1905, an excellent colored plate illustrating "The Chinch-bug: five stages of development and the eggs." In the descriptions, however, he stated that "the chinch-bug molts four times after hatching." A careful examination of available literature on the subject failed to bring to light a single exception to the original four-stage notion of Riley.

In the spring of 1916, I had an opportunity, at the Kansas Experiment Station to raise the insect under conditions which permitted close observations and obtained invariably five molts instead of four, as is generally believed. The extra molt or stage exists between either the first and second stages or second and third stages of Riley. The exact sequence of this extra stage is difficult to state because of the inadequacy of the original description. The five nymphal stages, as I found them, are distinct and can be distinguished

from one another on a definite structural basis. They can be readily distinguished by the degree of the development of the mesothoracic wing pads as follows: First stage, no wing pads discernible, no dusky bands on the mesothorax; second stage, no wing pads visible but a dusky band on each side of the meson of the mesothorax, the caudal margin of the dusky areas straight; third stage, rudimentary wing pads visible as a slight projection from the caudal margin of each dusky band on the mesothorax, the tip of the wing pads not reaching the caudal margin of the mesothorax; fourth stage, the wing pads distinct, extend on to but not beyond the first abdominal segment; fifth stage, wing pads very distinct, extend on to and sometimes beyond the second abdominal segment. These five stages were found in the fields, indicating that the extra molt occurs in nature and was not an abnormality produced under artificial conditions. Detailed descriptions of different stages will be published later. —Hachiro Yuasa, University of Illinois, Urbana, Ill.

Emergency Entomological Service.

Publication of the reports issued under this heading by the United States Department of Agriculture reporting co-operation between Federal, State and Station Entomologists and other agencies, suspended since early January (see the News for February, 1918, pp. 72-74), has been resumed with No. 11 for May 1, 1918, consisting of 40 mimeographed pages.

As in the earlier issues, this number contains notes on many different entomological topics, so that it is difficult to give a summary of its most important contents in a small space. The data given are not only of direct economic value, but also of much ecological interest.

The foreword says, "The general tenor of all the reports is that there has been considerable climatic control of insects during the past winter. It will be of great interest to watch the conditions this year with a view to determining, if possible, what that control has been compared with other years." Thus, winter-killing, in large percentages, of Coleopterous and Lepidopterous larvae is reported from Connecticut, of bag-worms in West Virginia, of scale insects in Michigan, Rhode Island and District of Columbia, of the Argentine ant at New Orleans, of codling moth larvae in parts (but not all) of the Arkansas valley and in Illinois, of aphids in Virginia and Indiana; boring larvae in dead trees, however, are exceptions to this statement. Winter losses were unusually heavy among bees that were not properly protected in the clover region. In California, where the climatic conditions were less severe, aphids appeared in injurious numbers in January, and the cotton leaf-perforator (*Bucculatrix thurberiella*) has appeared "much earlier than ever before observed," as a "quite alarming" outbreak in the Imperial Valley. In southern Arizona "ex-

ceptionally cold nights" by interfering with the development of parasites has resulted in a very serious infestation of aphids in April. The citrus white fly (*Dialeurodes citri*) has been checked in its development but not killed "to any material degree" by cold spells in Louisiana. The entomological department of the Florida Plant Board is preparing for distribution cultures of the Red and Yellow *Aschersonia* fungi which are specific enemies of this insect.

Among insect enemies of special importance are noted the Sweet Potato Weevil (*Cyclas formicarius*) which has been found on an additional plant (*Calonyotion bona-nox*) in Florida; certain varieties of the morning glory, especially *Ipomoea pes-caprae*, are considered to be the preferred host plants of this weevil and hence may serve as successful "catch crops." Heavy losses from this insect have been suffered in Texas.

The acreage in Irish potatoes in Louisiana is unusually large with complaints of injury by the Colorado beetle.

The Hessian fly began emergence in southern Illinois on April 1, a week earlier than in 1917, and was in flight in southeastern Missouri on March 18; little damage from this insect to the winter wheat crop of 1918 is expected, however. An interesting relation between this fly and joint worms is brought out, but is too lengthy for inclusion here. The worst injury to wheat in Kansas has been caused by the false wire worm, *Eleodes opaca*.

Abundant rains in parts of Texas in the first half of April are credited with having killed nearly all the chinch bugs there. Outbreaks are possible in southern Illinois and parts of Missouri and Kansas.

A European corn stalk borer (*Pyrausta nubilalis* Hübn.) is very abundant in eastern Massachusettts, causing serious anxiety. It may be made a subject of quarantine by the Federal Horticultural Board.

A warning of probable destructive outbreaks of white grubs in many sections north of a line from Philadelphia to Des Moines is sounded.

Heavy infestations of canker worms are noted in Mississippi, the eastern part of Kansas and northeastern Ohio.

The plum curculio is expected in large numbers in Georgia and in Ohio.

The pear thrips has been more abundant than usual in the San Francisco Bay region of California.

Both the cottony cushion scale (*Icerya purchasi*) and its enemy, the *Vedalia* lady-bird, overwintered successfully at New Orleans, the former only being killed when its host plant was destroyed; "the present status of *Icerya* control at New Orleans looks very encouraging." In Tulare County, California, spraying orchards with a proprietary combined insecticide and fungicide containing arsenicals destroyed the *Vedalia*, resulting in a "very striking and most interesting" outbreak of the cottony cushon scale on citrus. *Vedalia* is being furnished by hundreds to growers in Florida by the State Plant Board.

"The destruction and cleaning up of cotton in and surrounding the districts in Texas invaded by the pink boll worm is now practically completed for the crop of 1917 . . . . A total of 8794 acres of cotton land has been cleared of standing and scattered cotton at an average cost of $9.94 per acre. The cotton fields cleaned represent 657 owners or tenants . . . . Proclamations have been issued by the Governor of Texas quarantining the known infested districts in Texas . . . . Within these areas the growing of cotton is designated a public menace and is prohibited for a term of three years, or so long as such condition of menace to the cotton industry shall be deemed to exist." The boll weevil and the pink boll worm are still found in Arizona.

Indications are favorable for outbreaks of grasshoppers in the western half of Kansas and in Montana, and of plant lice in Wisconsin.

"The general situation in regard to insecticides over the country is favorable as regards the amount of materials on hand or apparently available. A considerable increase in cost of certain classes of insecticides, however, is to be noted, especially arsenical insecticides, lime-sulphur preparations and fish-oil soaps." Prof. A. L. Lovett, of Oregon, expresses the belief that a more thoroughly organized effort among entomologists for making tests of insecticides is desirable.

Several entomologists who have entered the Sanitary Corps of the Army having expressed a desire to keep in touch with problems which are being met by other entomologists, contributions from entomologists at the training camps will be welcome and will be given a separate heading in future numbers of these Reports. Screw-worm flies appeared in unusual numbers in April in certain parts of Texas, which is partly ascribed to the large number of carcasses of animals which died as a result of the extreme drought in southwest Texas and were not properly cared for. In the absence of Prof. W. B. Herms, now a Captain in the Sanitary Service, the mosquito survey of California will be continued this year by Prof. S. B. Freeborn and the State Board of Health, and it is hoped to complete it this year. A malarial mosquito survey of Missouri is under way.

"The exports of 1917 honey to Europe, especially to the United Kingdom, have exceeded by far any previous year. During the winter it was common for more honey to leave for Europe in ten days than in any year previous to 1914. Imports have been very heavy, but honey is now included in the list of articles of which the imports are restricted . . . . Requests for help in the work [of Apiculture]. . . . . especially for the service of extension men, are far greater than can be filled because of a lack of both money and available men."

The State Entomologist of Connecticut writes: "Here we are short-handed and it is hard to get help. Our funds are somewhat limited, and this probably is the case at many of the state institutions."

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new species are all grouped at the end of each Order of which they treat. Unless mentioned in the title, the number of the new species occurring north of Mexico is given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

4—The Canadian Entomologist. **5**—Psyche. **11**—Annals and Magazine of Natural History, 9th series, London. **12**—Comptes Rendus, Academie des Sciences, Paris. **50**—Proceedings, U. S. National Museum. **68**—Science, New York. **86**—Annales, Societe Entomologique de France, Paris. **87**—Bulletin, Societe Entomologique de France, Paris. **179**—Journal of Economic Entomology. **180**—Annals, Entomological Society of America. **184**—Journal of Experimental Zoology, Philadelphia. **189**—Journal of Entomology and Zoology, Claremont, Calif. **198**—Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass. **235**—Memorie, R. Accademia dei Lincei, 5th series, Roma. **240**—Maine Agricultural Experiment Station, Orono. **272**—Memorias, Real Academia de Ciencias y Artes de Barcelona. **306**—Journal, College of Agriculture, Imperial University of Tokyo. **411**—Bulletin, The Brooklyn Entomological Society. **420**—Insecutor Inscitiae Menstruus, Washington. **447**—Journal of Agricultural Research, Washington. **490**—The Journal of Parasitology, Urbana, Illinois. **548**—Physis. Revista de la Sociedad Argentina de Ciencias Naturales.

GENERAL SUBJECT. Campos, F.—Algunos casos teratologicos observados en los artropodos, **180,** xi, 97-8. **Needham, J. G.**—Aquatic insects (in Ward & Whipple. Fresh-water biology, pp. 876-946). **Brittain, W. H.**—The insect collections of the Maritime Provinces [Canada], **4,** 1, 117-22. **Bruch, C.**—Nuevas capturas de insectos mirmecofilos, **548,** iii, 458-66.

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OBITUARY.

The March, 1918, issue of *The Oölogist,* of Lacon, Illinois, contains an obituary notice and portrait of Ottomar Reinecke, who, in coöperation with Frank H. Zesch, published a "List of the Coleoptera Observed and Collected in the Vicinity of Buffalo" (*Bulletin, Buff. Soc. Nat. Sci.,* iv, pp. 2-15, July, 1881). This list gives the names of species only, collected "within a radius not exceeding fifteen miles [during] . . . a period of nearly fourteen years." An "Additional List of Coleoptera collected by Ottomar Reinecke," likewise of names only, appeared in January, 1882, on page 55 of the same volume. According to *The Oölogist,* Reinecke was born at Sondershaven, Germany, November 26, 1840, settled in Buffalo at the age of twelve years, and died there, November 26, 1917. He was a printer, editor and a proprietor of the *Freie Presse,* park commissioner and business man, and a student of birds as well as of beetles.

The death of Dr. Emile Frey-Gessner, of Geneva, Switzerland, an honorary fellow of the Entomological Society of London since 1912, was announced at the meeting of that Society held October 3, 1917, but without further particulars.

The English journals print obituaries of William Henry Harwood, English Lepidopterist and Hymenopterist, born February 25, 1840; died December 24, 1917, (*Ent. Mo. Mag.,* Feby., 1918), and of Richard S. Standen, English Lepidopterist and artist, born October 11, 1835; died July 29, 1917 (*Entomologist,* Nov., 1917; *Ent. Mo. Mag.,* Dec., 1917.)

EXCHANGES.

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

☞ **These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.**

Wanted—North American Coleoptera for exchange. Please send lists to V. Harnach, 1759 W. 20th St., Chicago, Illinois.

South American Erycinidae and Lycaenidae are offered in exchange for North American moths (Noctuids, Geometers, etc.).—G. Chagnon, P. O. Box 521, Montreal, Canada.

Wanted—Monog. des Buprestides—Kerremans, Vol. II, Pt. 1; Bibliog. Econ. Ent., Pt. IV; Mo. Bul. Cal. Com. Hort., Vol. I, No. 9, and Vol. II, Nos. 3 and 4.—E. A. Klages, Crafton, Pa.

Wanted—Friendly correspondence and exchange of Lepidoptera. Send your address and offerta. Will reply promptly.—F. E. Potter, 267 So. Main St., New Britain, Conn.

For Exchange—A few specimens, mostly Sphingidae and Saturniidae common to this region, for species from some other part of the country.—Dr. Elmer T. Learned, Fall River, Mass.

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Catocalae—For exchange perfect specimens of *C. pura, C. aspasia* and var. *sara, C. faustina* var. *lydia, C. praeclara.* Desire other *Catocalae.* Some of the common species wanted.—John H. West, 2057 E. York St., Phila., Pa.

Wanted to Exchange—I wish to exchange Rhopalocera from eastern United States for those of the western and southern part. Correspondence desired. Paul N. Musgrave, Pennsboro, W. Va.

Wanted in series for cash or exchange beetles of the genus *Serica* (Scarabaeidae) from all parts of North America. *Cicindela lincolniana* Casey among the exchanges offered. R. W. Dawson, Department of Entomology, University Farm, Lincoln, Nebraska.

Prof. Dr. Carlos E. Porter, Directeur des "Anales de Zoologia Aplicada," Casilla 2974, Santiago, Chile, is anxious to secure systematic papers on entomology, especially on the Thysanoptera, Coccidae, Aleyrodidae, Acarina, Chalcididae, Agromyzidae, Syrphidae and Longicornia. He will be glad to exchange specimens and publications.

Change of Address.—E. G. Titus from Logan, Utah, to Box 453, Idaho Falls Idaho.

Wanted for Cash.—Lowest insects of all families, preserved in fluid, for phylogenetic study. G. C. Crampton, Amherst, Mass.

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